

ABSTRACT

A membrane filtration device has a multiplicity of hollow fiber membranes, or fibers, unconfined in a shell of a module; a first header and a second header disposed in vertically spaced-apart relationship; said first header and said second header having opposed ends of each fiber sealingly secured therein, all open ends of said fibers open to a permeate-discharging face of at least one header; permeate collection means to collect said permeate, sealingly connected in open fluid communication with a permeate-discharging face of at least one of said headers; means to withdraw said permeate; said fibers, said headers and said permeate collection means together forming an integrated combination wherein said fibers are essentially vertically disposed and ends of individual fibers are potted in closely spaced-apart relationship in cured resin; with opposed faces at a fixed distance; each of said fibers having a length from 0.1% to less than 5% greater.